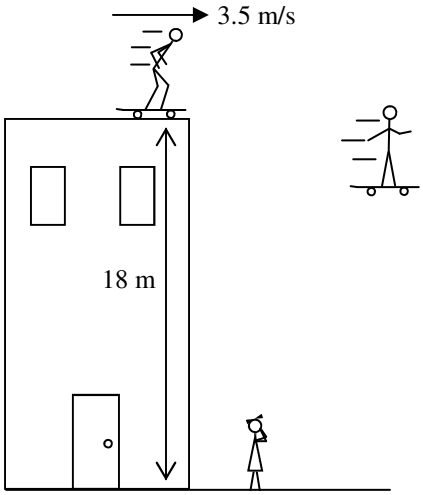
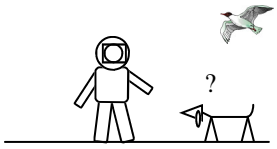
A-Day: Due Fri., Jan 8
B-Day: Due Mon., Jan 11

2009-10 Fall Finals 1

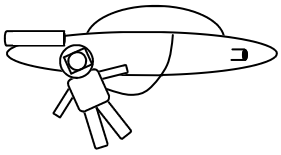


1. In his latest botched attempt to impress Slim Kim, Slim Jim rides his skateboard off the top of a horizontal roof.
   A. What kind or kinds of energy does he have just as he leaves the roof?
   B. Calculate his total energy as he leaves the roof.
   C. Since he leaves the roof horizontally, what is his initial y-velocity: Viy =
   D. What is his acceleration in the x-direction: a_x =
   E. What is his acceleration in the y-direction: a_y =
   F. Does he go up 18m or down 18m?
   G. What is his vertical displacement as he falls to the ground: Δy =
   H. Under the diagram, use a kinematic equation to calculate how long it takes for him to reach the ground.
   I. Calculate how far away from the edge of the building he lands (Δx).

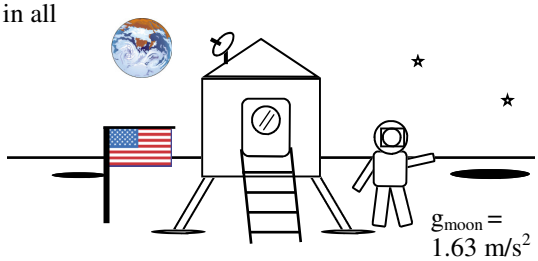
2. Slim Jim is 95 kg in his astronaut suit. Give Slim Jim's mass and weight in all three of the following situations.



As he is training on the earth:
m = Fw =



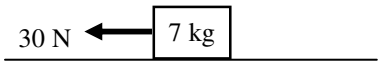
As he is fixing the "Galactic Cruiser" in space:
m = Fw =



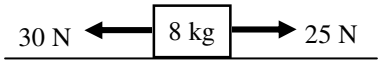
As he is working on the moon:
m = Fw =

3. Calculate the acceleration of the following two objects.

A.



B.



4. Slim Jim pulls a 5 kg object up a ramp.
   A. Above the diagram draw the force diagram for the object if there is friction on the ramp.
   B. Calculate the work Jim does to move it up the ramp.
   C. Calculate its final energy.
   D. Calculate the efficiency of the transfer.